

REMARKS/ARGUMENTS

Claims 1-4, 6, 11-13, 15, 17, 18, 20, 23, 26, 27, 31-34 and 40 are pending herein, claims 1 and 20 being independent. Claims 20, 23, 26, 27, 31-34 and 40 have been withdrawn from consideration at this time. Claims 1, 2, 15 and 17 have been amended herein. It is believed that the amendments are cosmetic only and make no substantive changes in the claims.

In the pending Final Rejection, the Examiner rejected claims 1-3, 6, 13, 15, 17 and 18 under 35 U.S.C. § 103(a) as allegedly obvious over United States Patent No. 5,725,376 (Poirier) in view of United States Patents Nos. 6,118,845 (Simon, *et al.*) and 6,201,880 (Elbaum, *et al.*); claims 4 and 12 under 35 U.S.C. § 103(a) as obvious over Poirier, Simon, *et al.* and Elbaum, *et al.*, in further view of United States Patent No. 5,927,982 (Kruger) and claim 11 under 35 U.S.C. § 103(a) as obvious over Poirier, Simon, *et al.* and Elbaum, *et al.*, in further view of United States Patent No. 6,488, 503 (Lichkus, *et al.*). Applicants have carefully considered the Examiner's rejections and the grounds offered in support thereof, but respectfully submit that the claims present allowable subject matter. Furthermore, it is submitted that the finality of the rejection is premature as the Final Rejection is premised upon art that was not previously of record, and the addition of this art was not required by any amendment made by applicants, as applicants stated that the prior amendments were cosmetic only and the Examiner did not disagree or even argue that the new grounds for rejection were necessitated by any amendment to the claims made by applicants.

THE FINAL REJECTION IS RESPONSIVE TO A COMMUNICATION FILED FEBRUARY 28, 2008

As a preliminary matter, the Examiner indicates that the Final Rejection is in response to "communication(s) filed on 16 April 2008." It is noted that the prior response was mailed by counsel for applicants on February 26, 2008, and received by the Office on February 28, 2008.

According to PAIR, the response was *forwarded to the Examiner* on April 16, 2008, but that is not the date it was *filed*. This is relevant for two reasons. First, the record should be clear that the prior response was filed in a timely manner, so that there is no question that applicants did not abandon the application. Second, for purposes of Patent Term Adjustment, the date the prior response was received by the Office is the date on which adjustments are to be based, and not the date it was forwarded to the Examiner.

Accordingly, correction is requested.

THE FINALITY OF THE INSTANT OFFICE ACTION IS PREMATURE.

According to M.P.E.P. § 706.07(a):

“A second or any subsequent action on the merits in any application or patent involved in reexamination proceedings should not be made final if it includes a rejection, on prior art not of record, of any claim amended to include limitations which should reasonably have been expected to be claimed.”

In this case, the Examiner introduced new grounds for rejection on new art, not previously of record. While the prior response did include some minor amendments to the claims, those amendments were purely cosmetic, and did not introduce any new limitations that could not have been foreseen. In the prior response, these amendments were identified as cosmetic, and the Examiner did not disagree with that characterization of the amendments. It is also pointed out that the Examiner did not state that the new grounds for rejection were required by the amendments entered, and did not even characterize these new grounds as responsive to the *amendments* made in the prior response. Rather, the Examiner characterized the new grounds as meeting the *arguments* raised by applicants in the prior response. Thus, under M.P.E.P. § 706.07(a), the rejection should not have been made final as it is premised upon new art not of

record, and the new grounds were not necessitated by applicants' amendment. Withdrawal of the finality of the Action is requested.

THE ART DOES NOT SUPPORT THE EXAMINER'S ANALYSIS.

The following discussion is taken largely from the prior response, with attention paid to the Examiner's analysis thereof in the Final Rejection.

The following description of the invention is taken from the specification and is provided for the Examiner's convenience. It is not intended to argue limitations not present in the claims, or to argue for an interpretation of any claim term that is more narrow than would otherwise be understood by one of ordinary skill in the art based upon a full and fair reading of the application as a whole.

The invention is directed to a method for producing an artifact-corrected image of a negative jaw impression, so that an accurate drilling template may be made of the patient's jaw. The method comprises forming a negative impression of the patient's jaw. Most patients' jaws include non-naturally occurring metal inserts, such as fillings. If a CT scan is taken of a patient's jaw with metal fillings in it, the metal fillings obscure any portion of the jaw that is located behind the filling. Additionally, the fillings scatter the x-rays or CT rays that impinge thereon so that the image of the jaw in the vicinity of the fillings is not complete and is likely to be distorted. These distortions are referred to as "artifacts" in the instant application (*see*, para. [0009]: "When the recipient mouth contains metal inserts such as tooth fillings, the image produced using CT contains many artifacts that smear and/or distort the true surface boundaries of the recipient jaw.").

The specification continues:

[0015] In an exemplary embodiment of the present invention, a negative impression is made of a recipient jaw and two digital images are made using, for

example, CT, MRI or another imaging system. A first distorted image is made that includes the negative mouth impression installed in the recipient jaw including the metal inserts, for example *metal fillings, and their resultant artifacts*. A second image is made only of the negative impression. As the negative impression template does not include *metal inserts*, the resultant image correctly reproduces an image that is free of *artifacts*.” (emphasis added)

In the prior response, applicants pointed out the meaning of the term “artifact” as used in the specification, and argued that this meaning should be ascribed to the term in the claims. The Examiner disagreed, and argued that the claims must be given the broadest possible interpretation, and that limitations from the specification cannot be imported into the claims. While applicants agree with both of these points, they do not address a fundamental principle of claim interpretation: “The claims of a patent are always to be read or interpreted in the light of its specifications.” *Schriber-Schroth Co. v. Cleveland Trust Co.*, 311 U.S. 211, 217, 47 U.S.P.Q. 345, 347 (1940) quoted in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316, 75 U.S.P.Q.2d 1321, 1328 (Fed. Cir., 2005). *See, also*, M.P.E.P. § 2111. (“During patent examination, the pending claims must be ‘given their broadest reasonable interpretation *consistent with the specification*.’” – emphasis supplied).

Applicants not only presented the argument as to the proper interpretation to be given the term “artifact” as used in the claims, but also pointed to specific citations in the specification which supported this interpretation. Accordingly, it is submitted that the meaning ascribed to the term “artifact” is the only meaning consistent with the specification. To emphasize this definition, the claims have now been amended to recite specifically that the artifacts are derived from the presence of metal in the patient’s mouth, adding nothing to the meaning of the term, but underscoring its meaning more explicitly.

Thus, one of ordinary skill in the art would understand the way the term “artifact” is used in the claims to be in accord with the way it is used in the specification, as they must, to mean “artifacts resulting from the presence of metal inserts in the patient’s mouth”

The presence of these unavoidable artifacts resulting from metal in the patient’s mouth renders an uncorrected image of the jaw inaccurate. The invention herein provides a method for correcting the image of the jaw resulting from the presence of artifacts (as defined). This is accomplished by taking a digital image of the negative impression. This image is free of artifacts – because there are no metal artifacts in the negative impression – and provides a base reference for the later comparison. Preferably, the negative impression includes reference markings (claim 4). The inventive method further comprises taking a digital image of the negative impression while the negative impression is in the patient’s mouth. This image includes the artifacts to be corrected. According to the inventive method, the first and second images are compared, and from that comparison, an artifact-corrected image is produced. This image is the desired end result of the process, since it enables the formation of an accurate drilling template with full and accurate knowledge of the actual surfaces of the teeth.

Unless the artifacts are removed (*i.e.*, corrected), the drilling template may be less than perfectly accurate, which leads to problems if it is then used to drill into the patient’s jaw or teeth in the wrong location or at the wrong angle, or if the template is not securely mounted on the teeth (*see*, paras. [0015]-[0016]). The inventive method, therefore, overcomes the deficiencies of the prior art where artifacts were present.

One of the pieces of prior art mentioned in the specification is the Poirier patent (para. [0004]). As described there, Poirier teaches a known technique for making a drilling template based upon a *single* digital image of the teeth, without taking any image of a negative impression.

Poirier describes a method of forming a drilling template in which a *positive* model of a patient's teeth is made (physical model 21, 22). A scanner guide 27 is made "by hand to fit exactly the space occupied by the upper and lower denture" (col. 5, lines 44-45). Scanner guide 27 is thus *also* a *positive* impression of the patient's teeth, which is exactly the opposite of the claimed invention, which requires a *negative* impression of the patient's jaw. Poirier further never discloses a second image, as recognized by the Examiner (Final Rejection p. 3), and so falls short of describing the claimed invention.

The Examiner therefore proposes combining Simon, *et al.* with Poirier to show all of the claimed elements. Simon, *et al.*, however, fail to disclose a method which, even when combined with the teachings of Poirier, would render obvious the invention as claimed.

Simon, *et al.* disclose a system and method for reducing and eliminating artifacts in calibrating x-ray imagers. The Examiner has therefore taken the position that Simon, *et al.* teach the missing elements of the invention claimed herein. However, although Simon, *et al.* discuss "artifacts", their usage of that term is quite different from its usage in the instant application. In the claimed invention an "artifact" is a component of the image resulting from metal fillings, and the like, in a patient's mouth. In other words, an "artifact" results from what is present in the patient's mouth, not from what is introduced into the mouth by the practitioner of the method. In Simon, *et al.*, however, an "artifact" is a portion of the image that results from markers used to calibrate the x-ray system, and is therefore *not* something already present in the patient. The Simon, *et al.* "artifact" is something having a known value that is added and then eliminated (*see*, col. 6, lines 51-64). Such artifacts have a known value which can be eliminated easily (col. 7, lines 5-7: "Essentially, artifact elimination is performed by subtracting a pre-measured offset from each pixel in the marker projections.")). Unlike artifacts in the present invention, the Simon, *et al.* artifacts do

not present unknown variables which must be determined *before* they can be eliminated. Thus, the “artifacts” of Simon, *et al.*, present a far different, and much simpler to overcome, obstacle than the “artifacts” addressed by the instant invention, and so the mere mention of removing “artifacts” in Simon, *et al.* does not meet the claim limitation of producing an “artifact-corrected” image (*see, also, Simon, et al. col. 1, lines 64-65: “The calibration markers are rigidly arranged in predetermined patterns in one or more planes in the path of the x-rays. . .”*).

Simon, *et al.* call small spots stemming from markers placed by the user “artifacts”. The position and shape of the Simon, *et al.* “artifacts” are known. They stop most of the x-ray radiation and therefore any information that lies in the path of the blocked x-ray becomes (at least) partially unavailable. Simon, *et al.*’s method consists of rotating the system such that the information behind the spots is calculated and becomes available. From the point of view of one having ordinary skills in the art, these spots are not truly “artifacts” as that term is used by applicants herein, rather they represent markers used as part of the Simon, *et al.* method. In the context of the present application, one of ordinary skill in the art would understand “artifacts” to be false details of radiologic images and it is clear that the spots discussed by Simon, *et al.* are completely correct images of the markers placed according to their invention.

The instant method, however, deals with artifacts resulting from the presence of metal in the patient’s mouth (*e.g.*, fillings) whose source is data that becomes inconsistent data following strong scattering. These artifacts are significantly larger than the tiny spots referred to by Simon, *et al.* The missing data cannot be recalculated from the data set where they appear, as in the Simon, *et al.* patent. Their position, intensity and shape are unpredictable and therefore images that include such artifacts need special treatment, as described by the instant application, *viz.* using a second set of images.

In sum, therefore, neither Poirier nor Simon, *et al.* disclose, teach or suggest:

1. forming a negative impression of a patient's jaw;
2. taking a first image of the negative impression,
3. taking a second image of the negative impression with the patient's jaw,
4. comparing the two images, or
5. producing a more accurate image of the patient's jaw, without artifacts of fillings

therein, as a result of the comparison.

Furthermore, Simon, *et al.* do not teach the use of a negative impression of the patient, and comparing the known image of the negative impression with the image taken of the impression in the patient's mouth to remove *unknown* artifacts from the image and create thereby a more accurate image of the actual jaw of the patient.

Thus, the proposed combination of references applied by the Examiner falls short of teaching *any* of the elements of the claimed invention, let alone all of them.

To overcome these deficiencies, the Examiner has introduced the Elbaum, *et al.* patent. On review, however, this reference, as well, falls short of providing the rationale for modifying the primary combination of references upon which the Examiner has relied.

Elbaum, *et al.* teach a method for imaging a tooth by passing visible light through it. The method includes the possibility of comparing images taken *over time* to track any changes in the tooth over time, *e.g.*, dental caries (*see*, Abstract, lines 9-12). They do not teach taking two images at substantially the same time of the mouth in two different conditions to remove artifacts caused by the presence of metal therein. In fact, if a patient being subjected to the Elbaum, *et al.* method had fillings before the first image was taken, those *same* fillings would be present in *both* images,

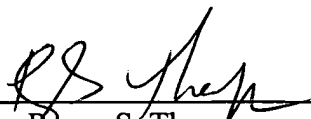
making the comparison useless to correct for artifacts caused by the presence of metal in the mouth.

It is noted that the Examiner has cited the Supreme Court decision in *KSR* for the current test for obviousness in light of a combination of references. However, the Court in *KSR* also made clear that a mere collection of parts from prior art references without motivation to combine or modify them is insufficient to show obviousness. Here, there is nothing in the art to link the references suggested by the Examiner *in the manner claimed* to result in the claimed invention. Thus, the addition of the Elbaum, *et al.* reference does nothing to render obvious the claimed invention.

For all these reasons, therefore, it is submitted that the invention as claimed is patentably distinct from the primary combination applied by the Examiner. The addition of the Kruger and/or Lichkus, *et al.* patents overcome none of the deficiencies of the primary combination, and so the invention as claimed distinguishes over all of the art applied by the Examiner.

It is believed that no fees or charges are required at this time in connection with the present application. However, if any fees or charges are required at this time, they may be charged to our Patent and Trademark Office Deposit Account No. 03-2412.

Respectfully submitted,
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Dated: July 7, 2008